

Amendments to the Claims

1. (currently amended) An optical modulator for encoding data on orthogonally polarized alternate light pulses comprising:

means for modifying a laser light beam to a pulse train at a first frequency;
a single data modulator for encoding signal data on the pulse train at a second data stream frequency where the second frequency is greater than or equal to the first frequency; and

means for rotating a polarization state of at least alternate light pulses of the pulse train to provide a data stream of orthogonally polarized alternate light pulses comprising:

a narrow band Mach Zehnder having a single input port and a first and a second output port for directing alternate light pulses to a first optical path and a second optical path respectively, including a driver electrically coupled to the pulse generator for synchronizing the narrow band Mach Zehnder to the frequency of the pulse train, wherein the driver selects the first or the second output port for each light pulse;

a passive polarization rotator disposed on one of the first optical path and the second optical path for changing the polarization of light pulses passing therethrough; and

means for combining orthogonally polarized light pulses from the first and second optical paths into a single data stream of alternate orthogonally polarized light pulses.

2. (original) An optical modulator as defined in claim 1, wherein the means for modifying a laser light beam comprises a pulse generator for providing a pulse train of light pulses from a continuous wave laser beam.

3. (original) An optical modulator as defined in claim 2, wherein the pulse generator produces pulses at substantially 40 GHz.

4. – 6. (cancelled)

7. (original) An optical modulator as defined in claim 6, wherein the first output port and the second output port are optically coupled to a polarization beam combiner through a half wave plate optically coupled to one of the first output port and the second output port, and through a spacer for providing an equal path length optically coupled to the other of the first output port and the second output port.

8. – 15. (cancelled)

16. (currently amended) An integrated data modulator optical circuit comprising:
a laser light source;
a pulse generator comprising a first Mach-Zehnder device integrated on a substrate coupled to the laser light source for producing a pulse train;
a data modulator comprising a second Mach-Zehnder device integrated on the substrate for encoding data on the pulse train; and
means for interleaving alternate pulses of orthogonal polarization onto a single pulse train comprising a third Mach-Zehnder device integrated on the substrate having a first output port and a second output port for separating alternate pulses to a first optical path and a second optical path, further including a passive polarization rotator optically coupled to the first optical path for rotating at least alternate pulses, and a polarization combiner for interleaving alternate pulses from the first optical path and the second optical path.

17. (original) An integrated data modulator optical circuit as defined in claim 16 further including means for redirecting and focusing light from a first integrated device into a second integrated device on the same substrate.

18. (original) An integrated data modulator optical circuit as defined in claim 17, wherein the means for redirecting and focusing light comprises a graded index lens optically coupled at a first end to the substrate symmetrically disposed between the first integrated

device and the second integrated device, and having a reflective element at a second end thereof.

19. (currently amended) A method of encoding data on a light pulse train of alternate polarization interleaved bits comprising the steps of:

providing a single pulse train of light pulses at a first frequency;

encoding data on the single pulse train at a second data stream frequency where the second frequency is greater than or equal to the first frequency;

passing at least alternate pulses, in dependence upon a clock synchronized with the pulse train, through a passive polarization rotator to rotate alternate pulses to orthogonal polarization states; and

interleaving the orthogonally polarized pulses, by interleaving the alternate pulses from the polarization rotator with alternate pulses which did not pass through the polarization rotator for transmission in an optical system.

20. – 22. (cancelled)

23. (new) An optical modulator as defined in claim 3 wherein the narrow band Mach Zehnder has a frequency of substantially 20 GHz.

24. (new) An integrated data modulator optical circuit as defined in claim 16, wherein the narrow band Mach Zehnder has a frequency that is half the frequency of the data modulator and has a driver synchronized with the pulse generator.